DELAWARE HEALTH AND SOCIAL SERVICES
Division of Public Health

Frequently Asked Questions

BENZO(A)PYRENE

What is BENZO(A)PYRENE?

Benzo(a)pyrene is part of a class of chemicals called polycyclic aromatic hydrocarbons (PAH). PAHs usually occur as complex mixtures, not as single compounds. Benzo(a)pyrene is on the priority pollutant list published by the U.S. Environmental Protection Agency (EPA).

Where can benzo(a)pyrene be found and how is it used?

Benzo(a)pyrene is found in nature from the eruption of volcanoes and forest fires. Yet this chemical compound is also man-made. Benzo(a)pyrene can be found in surface water, tap water, rainwater, groundwater, wastewater and sewage sludge. Man-made releases of benzo(a)pyrene are to the air, where sunlight turns the chemical into a dry form that falls to the ground and breaks down in the soil. This chemical results from burning plants, wood, coal, and operating cars, trucks and other vehicles. The major indoor sources of benzo(a)pyrene in the air are wood-burning fireplaces and stoves, and tobacco smoking. There is no known industry production or use of benzo(a)pyrene.

How can people be exposed to benzo(a)pyrene?

You could be exposed to benzo(a)pyrene through:

Breathing air containing benzo(a)pyrene in the workplace. This can occur if you work in coking, coal-tar and asphalt production plants, or in smokehouses or where local trash is burned. You can also breathe benzo(a)pyrene from cigarette smoke, wood smoke, vehicle exhaust, asphalt roads or smoke from burning farm plants.

Contact with benzo(a)pyrene in the air, water, or soil near a waste site, or another polluted site.

Eating grilled or charred meats. You can also be exposed through contaminated cereals, flour, bread, vegetables, fruits, meats; and processed or pickled foods.

Drinking contaminated water or cow's milk. Nursing infants may be exposed through breast milk, especially if the mother lives near a waste site containing benzo(a)pyrene.

How does benzo(a)pyrene work and how can it affect my health?

Short-term health effects can be a skin rash or eye irritation with redness and/or a burning sensation. Exposure to sunlight and the chemical together can increase these effects.

Long-term health effects can be deadly. Benzo[a]pyrene is a probable cancer-causing agent in humans. There is some evidence that it causes skin, lung, and bladder cancer in humans and in animals. If benzo(a)pyrene is on your skin when you are being exposed to sunlight or ultraviolet light, the risk of skin cancer is greater. Exposure to coal tar and pitch increases the likelihood of cancer. Repeated exposure to substances containing benzo[a]pyrene may cause the skin to thicken and darken, and for pimples to appear. Long-term skin changes include both loss of color and reddish areas, thinning of the skin and warts. Bronchitis may result from repeated exposure to mixtures containing benzo(a)pyrene.

How is benzo(a)pyrene poisoning treated?

There is no treatment for benzo(a)pyrene. A doctor will treat the symptoms. In all cases of poisoning, medical treatment should be sought and a doctor may prescribe a different treatment depending on circumstances of the poisoning and the symptoms.

What should I do if exposed to benzo(a)pyrene?

Anyone who may have been exposed to high levels of benzo(a)pyrene should be removed from the source of exposure immediately. Clothing in contact with benzo(a)pyrene should be removed and discarded. Skin and eyes exposed to benzo(a)pyrene should be flushed with clean water for at least 15 minutes. Seek medical attention immediately.

What factors limit use or exposure to benzo(a)pyrene?

Workers should use benzo(a)pyrene in a regulated, enclosed area with local exhaust ventilation. If venting is unavailable, workers should wear respirators. All workers should wear protective work clothing. The area should be marked as a site where benzo(a)pyrene is handled, used, stored or formed. Hazard and warning information should be posted. In the case of a chemical release, workers should wash thoroughly immediately after exposure and at the end of the work shift. Communicate all health and safety information to potentially exposed workers before releases occur.

Is there a medical test to show whether I've been exposed to benzo(a)pyrene?

There are tests that can show PAHs in body tissues or blood. These tests cannot show how much a person was exposed to or how the exposure occurred. They also cannot tell if there will be harmful effects.

Technical information for benzo(a)pyrene

CAS Number: 50-32-8

Chemical Formula: $C_{20}H_{12}$

Carcinogenicity (EPA): B2 – Probable human carcinogen.

MCL (Drinking Water): 0.0002 mg/L

OSHA Standards: Regulates exposure limits to benzo[a]pyrene indirectly as "Coal Tar Pitch volatiles." The legal airborne permissible exposure limit (PEL) is 0.2 mg/m^3 averaged over an 8-hour work shift.

NIOSH Standards: Indirectly as coal tar products. The exposure limit is 0.1 mg/m ≥ for a 10-hour workday, within a 40-hour workweek.

References and Sources

Agency for Toxic Substances and Disease Registry (ATSDR). 1995. *Toxicological Profile for polycyclic aromatic hydrocarbons (PAHs).* Atlanta, GA: U.S. Department of Health and Human Services.

ATSDR Fact Sheet on Polycyclic Aromatic Hydrocarbons, on-line version, http://www.atsdr.cdc.gov/tfacts69.pdf, May, 2006 (accessed 9/25/09)

U.S. EPA Drinking Water Standards and Health Advisories, 2004 Edition, on-line version, http://www.epa.gov/waterscience/drinking/standards/dwstandards.pdf (accessed 9/25/09)